

THE PERIGLACIAL ENVIRONMENT (second edition) by Hugh M. French, Longman, No. of pages: 341. Price: £22.99. ISBN 0-582-30536-5.

The second edition of this long-established text was certainly worth waiting for. The book has not only been updated, but the presentation is modernized, with clearer line drawings, many new diagrams and photographs, and new chapters on cryogenic weathering, applied aspects of periglacial geomorphology, landscape evolution, and the potential impacts of global warming. The text is aimed at undergraduates in geography and geology, but will also be valuable to engineering students concerned with construction in permafrost. Each chapter is prefaced by a summary, and ends with a series of discussion topics. The book is divided into four parts: Part 1 describes the periglacial domain; Part 2, present-day periglacial environments and processes; Part 3, Pleistocene periglacial environments; and Part 4, applied aspects.

Chapter 1 discusses concepts and processes relating to the periglacial zone, its definition and general character. This is followed by a chapter on periglacial landscapes in which the author emphasizes that many periglacial areas have been recently glaciated and illustrates the effects of prolonged periglacial climates with reference to one upland and one lowland area in the never-glaciated region of northern Canada. Chapter 3, the final chapter in Part 1, reviews the range and complexity of periglacial climates. Soil freezing processes and cryogenic physical and chemical rock weathering are discussed in Chapter 4. The next chapter is concerned with permafrost and discusses thermal conditions, definitions, distributions, surface features, hydrology, hydrogeology and hydrochemistry. The bias towards arctic permafrost in the author's research experience is clear, with relatively little space given to mountain permafrost phenomena. Ground ice is discussed in Chapter 6, beginning with an outline of cryostratigraphic description and leading the reader through the classification, character and origin of ground ice phenomena. Inevitably, this chapter relies heavily on the considerable literature available from the Canadian arctic.

The nature of the active-layer and active-layer processes, such as frost heave of soil and bedrock, frost sorting, thaw

consolidation, cryoturbation and patterned ground formation, are discussed in Chapter 7. The next two chapters deal with hillslope processes and slope morphology. The latter chapter outlines concepts such as the evolution of Richter slopes, the development of cryopediments, processes of cryoplanation, and the formation of smaller-scale phenomena such as tors. Periglacial fluvial processes and landforms are discussed in Chapter 11, particularly with respect to the hydrology, channel form and valley morphology of periglacial rivers. Although sediment transport rates are discussed, it is a pity that the author provides no review of the sedimentology of modern periglacial fluvial deposits, since their Pleistocene counterparts may yield much more important palaeoenvironmental information. Part 2 of the book is concluded with an account of wind action and coastal processes in the periglacial zone.

Pleistocene periglacial environments are discussed in three chapters, firstly outlining timescales and problems of palaeoclimatic reconstruction, secondly discussing relict periglacial phenomena, and finally reviewing the nature and distribution of Pleistocene periglacial aeolian and fluvial deposits and landforms. European and North American examples are included, and although individual sites are often only briefly described, the references given at the end of each chapter lead the student into more extended reading.

Part 4 of this book comprises two new chapters dealing with geotechnical engineering in permafrost regions, and with the possible effects of global climate change. Both topics are to be welcomed since they emphasize the importance of understanding geomorphological processes in planning the development of this thermally sensitive region, and anticipating future environmental consequences of global change. Both chapters are clearly presented, and the problems of engineering construction on permafrost are particularly well illustrated with photographs from Siberia and the North American arctic.

The new edition of French's textbook provides an excellent update, is clear and concise in its explanations, and offers a wide range of excellent illustrations. Almost all aspects of periglacial geomorphology are covered, and this book will undoubtedly continue as the benchmark text for periglacial geomorphology studies for many years to come.

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BEACH MANAGEMENT by E. C. F. Bird, John Wiley & Sons Ltd, Chichester, 1996. No. of pages: x+281. Price: £37.50. ISBN 0-471-96337-2.

This book is another addition to the Coastal Morphology and Research series which includes Guilcher's *Coral Reef Geomorphology* and the author's own *Submerging Coasts*. It follows the formula which has been attractive in these earlier volumes: a good background of basic and largely non-technical material on coastal processes and landforms garnished with a tremendously wide range of examples of

coastal management, many taken from personal experience. The various ways in which beach erosion can arise – over 20 causes are listed – are well covered: an analysis which builds upon Bird's earlier (1985) *tour de horizon*, *Coastline Changes*.

The early sections of *Beach Management* are logically organized, discussing firstly the sources of beach sediments, then the dynamics of their accumulation, and then beach erosion. The role of artificial structures in exacerbating erosion problems follows and leads into a lengthy discussion of beach nourishment schemes. Over 90 such schemes are reviewed world-wide, accounting for a third of the book's

length. An abiding impression of this catalogue is the remarkably insensitive aesthetics of many beach protection schemes – particularly when there is no sign of the beach that they were designed to preserve. The volume concludes with a discussion of littoral hazards, pollution and conflict resolution in the beach environment.

The approach is strongly morphological – beach compartments, beach planform and beach profiles all feature strongly – and models (both hardware and mathematical) merit less than a page and no follow-up references for the interested reader. The linkage of the beach morphodynamics literature with descriptions of different beach profiles could have been more tightly organized, and a basic figure of fully reflective, fully dissipative and intermediate beach states is badly needed. Bird does raise a useful discussion on the validity and utility of the concept of the ‘equilibrium beach’ but the opportunity to move on to discuss non-equilibrium ideas is missed. And when it comes to shoreline change, the

applicability (or otherwise) of the ‘Bruun Rule’ to understanding beach response to sea-level rise really doesn’t do justice to this particular debate and its spin-offs.

*Beach Management* is most successful when weaving together case studies into a coherent narrative. At its worst, the case studies are merely descriptive rather than evaluative but some of the more detailed examples, such as those of Port Phillip Bay in southeastern Australia, do give a good insight into the challenges and complexities of coastal consultancy. These useful detailed examples will make the book attractive to researchers, students and planners concerned with managing the boundary between land and sea.

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ENVIRONMENTAL CHANGE: THE EVOLVING ECOSPHERE edited by Richard John Huggett, Routledge, London, 1997. No. of pages: xx+378. Price: £16.99 (pb). ISBN 0-415-14521-X.

The content of *Environmental Change* is far more original than its title. It is also a book of breath-taking range, both in terms of the temporal scale it covers and the phenomena it considers. Essentially, however, it is not about future global change, even though the publisher’s blurb suggests it may be. It is about the history of the world since its origin. It is well written, well illustrated and well referenced, and undergraduates would find it immensely informative. Unfortunately I suspect that the sheer width of the book, the fact that it does not restrict itself merely to the Quaternary Era, and its relative lack of concern with the fashionable future, may mean that it does not attract the readership it deserves.

The first chapter looks at the evidence for environmental change and how change is dated. Chapter two describes the nature of the Cosmos. The rest of the chapters then follow what Huggett describes as ‘a rigid and unconventional structure’ with each one consisting of five sections that in sequence are: the setting down of the basic material about the

structure and composition of a particular ‘sphere’; a description of the nature of change in that ‘sphere’; the causes of change, focusing on external and internal causes; the rate of change; and the directional aspects to change – cycles, steady states and trends. The ‘spheres’ that make up the chapters are the geological environment, atmosphere, hydrosphere, pedosphere, toposphere, and biosphere and ecosphere.

The structure can be frustrating. For example sea-level changes are treated in the hydrosphere chapter, but they occur as three separated chunks in the last three sections of the chapter, where they are interspersed with discussion of other types of hydrospheric change (e.g. lake-level changes and flood and drought cycles).

Plainly there is a considerable amount of subject matter that will be of direct concern to the geomorphologist, though there are few themes that are developed at any length. Nonetheless there are flashes of informative geomorphological originality, including the airing of the possibility that impact-induced superwaves could have moulded tracts of the British landscape, of which the lowly Bournemouth Chines are one example.

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ENVIRONMENTAL GEOLOGY: GEOLOGY AND THE HUMAN ENVIRONMENT by Matthew R. Bennett and Peter Doyle, John Wiley & Sons Ltd, Chichester, 1997. No. of pages: 501. Price: £18.99 (pb). ISBN 0-471-97459-5.

Research and teaching activity in environmental geology is continuing to grow rapidly. This ‘new’ discipline was

formulated 30 years ago in North America, has swept through Europe in the past decade, and is expanding now in the rest of the world. Its dual driving forces are, superficially, student attraction to the ‘environmental’ tag as a byword for relevant science and, more fundamentally, society’s urgent need to understand the geological components of environmental problems.

Bennett and Doyle’s book is therefore aimed at an